Complete Summary

GUIDELINE TITLE

British guideline on the management of asthma. A clinical national guideline.

BIBLIOGRAPHIC SOURCE(S)

Scottish Intercollegiate Guidelines Network (SIGN), British Thoracic Society. British guideline on the management of asthma. A national clinical guideline. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network (SIGN); 2007 Jul. 94 p. [680 references]

GUIDELINE STATUS

Note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Asthma

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management
Prevention
Treatment

CLINICAL SPECIALTY

Allergy and Immunology
Critical Care
Emergency Medicine
Family Practice
Internal Medicine
Obstetrics and Gynecology
Pediatrics
Pulmonary Medicine

INTENDED USERS

Advanced Practice Nurses
Nurses
Pharmacists
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

To provide comprehensive recommendations on asthma management for patients of all ages in both primary and secondary care that will be of use to all health professionals involved in the care of people with asthma

TARGET POPULATION

Children, adolescents, and adults with asthma

INTERVENTIONS AND PRACTICES CONSIDERED

Primary Prophylaxis

1. Encouragement of mothers to breastfeed their infants
2. Encouragement of parents and parents-to-be to stop smoking

Diagnosis/Evaluation

1. Detailed medical history and physical examination
2. Measurement of peak expiratory flow (PEF)
3. Measurement of forced expiratory volume in one second (FEV_1)
4. Chest x-ray
5. Allergy testing

Management/Treatment

Non-pharmacological Management

1. House dust mite control measures
2. Family therapy (i.e., in difficult childhood asthma, as an adjunct to pharmacological therapy)

3. Weight reduction in obese patients
4. Treatment of gastro-oesophageal reflux if present

Pharmacological Management

Note: The type of pharmacological management varies by age group and symptoms present. See the "Major Recommendations" field and the original guideline document for specific information on the stepwise approach and the appropriate age.

1. Short acting and long acting inhaled beta-2 agonists
2. Inhaled ipratropium bromide
3. Beta-2 agonists tablets or syrup
4. Theophyllines
5. Oral and inhaled steroids
6. Chromones
7. Leukotriene receptor antagonists
8. Immunosuppressants, such as methotrexate, cyclosporin, oral gold

Other Interventions Considered

1. Intranasal steroids for the treatment of rhinitis
2. Itraconazole for the treatment of allergic bronchopulmonary aspergillosis (ABPA)

Inhaler Devices

1. Pressurized metered-dose inhaler (pMDI) with or without spacer
2. Dry powder inhaler (DPI)
3. Nebuliser

Acute Asthma

Note: Management and treatment of acute asthma varies by age group. See "Major Recommendations" and the original guideline document for specific information on which interventions are recommended for each age segment.

1. Clinical assessment
2. Referral to hospital, when necessary
3. High flow oxygen
4. Nebulised $beta_2$ agonist bronchodilator driven by oxygen or large volume spacers or nebulisers
5. Intravenous beta-2 agonist
6. Continuous nebulisation
7. Steroid treatment, such as prednisolone
8. Nebulised ipratropium bromide
9. Intravenous magnesium sulphate
10. Intravenous aminophylline
11. Follow-up

Education/Counseling

1. Training on inhaler technique

2. Pre-pregnancy counseling
3. Self-management education, including pre-discharge education and action plans

MAJOR OUTCOMES CONSIDERED

- Patient symptoms
- Results of diagnostic tests
- Morbidity and mortality
- Side effects of treatments

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The electronic searches extended to 1995, although some sections required literature searches to go as far back as 1966. The Pharmacology section utilised the North of England Asthma Guideline to address any key questions on adult pharmacological management covered by that document. The North of England Guideline literature search covered a period from 1984 to December 1997, and the Scottish Intercollegiate Guidelines Network (SIGN) augmented this with a search from 1997 onwards. The April 2004 version of the guideline is based on a literature search dating up to and including March 2003, and the September 2005 changes are based on a search up to and including March 2004 with additional searches for section 4 carried out in August 2004. The changes to section 8 were developed using a comprehensive evidence based guideline on occupational asthma published by the British Occupational Health Research Foundation, developed using methodology similar to SIGN's. The British Thoracic Society (BTS)/SIGN occupational asthma sub-group were represented in this process and have selected those recommendations relevant to less specialized asthma management for inclusion here.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

1++ - High quality meta-analyses, systematic reviews of randomised controlled trials (RCTs), or RCTs with a very low risk of bias

1+ - Well-conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias

1- - Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias

2++ - High quality systematic reviews of case control or cohort studies. High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal

2+ - Well-conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal

2- - Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal

3 - Non-analytic studies (e.g. case reports, case series)

4 - Expert opinion

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Once papers have been selected as potential sources of evidence, the methodology used in each study is assessed to ensure its validity. SIGN has developed checklists to aid guideline developers to critically evaluate the methodology of different types of study design. The result of this assessment will affect the level of evidence allocated to the paper, which in turn will influence the grade of recommendation it supports.

The methodological assessment is based on a number of key questions that focus on those aspects of the study design that research has shown to have a significant influence on the validity of the results reported and conclusions drawn. These key questions differ between study types, and a range of checklists is used to bring a degree of consistency to the assessment process. Scottish Intercollegiate Guidelines Network (SIGN) has based its assessments on the MERGE (Method for Evaluating Research and Guideline Evidence) checklists developed by the New South Wales Department of Health, which have been subjected to wide consultation and evaluation. These checklists were subjected to detailed evaluation and adaptation to meet SIGN's requirements for a balance between methodological rigour and practicality of use.

The assessment process inevitably involves a degree of subjective judgment. The extent to which a study meets a particular criterion - e.g., an acceptable level of loss to follow up, and, more importantly, the likely impact of this on the reported results from the study will depend on the clinical context. To minimise any

potential bias resulting from this, each study must be evaluated independently by at least two group members. Any differences in assessment should then be discussed by the full group. Where differences cannot be resolved, an independent reviewer or an experienced member of SIGN Executive staff will arbitrate to reach an agreed quality assessment.

Evidence Tables

Evidence tables are compiled by SIGN executive staff based on the quality assessments of individual studies provided by guideline development group members. The tables summarise all the validated studies identified from the systematic literature review relating to each key question. They are presented in a standard format to make it easier to compare results across studies, and will present separately the evidence for each outcome measure used in the published studies. These evidence tables form an essential part of the guideline development record and ensure that the basis of the guideline development group's recommendations is transparent.

This guideline was jointly produced by SIGN and the British Thoracic Society (BTS), using SIGN methodology, adapted for United Kingdom-wide development. The Asthma United Kingdom (UK), the Royal College of Physicians of London, the Royal College of Paediatrics and Child Health, General Practice Airways Group, and the British Association of Accident and Emergency Medicine also collaborated in the development of this guideline.

Additional details can be found in the companion document titled "SIGN 50: A Guideline Developers' Handbook." (Edinburgh [UK]: Scottish Intercollegiate Guidelines Network. [SIGN publication; no. 50]), available from the Scottish Intercollegiate Guidelines Network (SIGN) Web site.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Synthesising the Evidence

Guideline recommendations are graded to differentiate between those based on strong evidence and those based on weak evidence. This judgment is made on the basis of an (objective) assessment of the design and quality of each study and a (perhaps more subjective) judgment on the consistency, clinical relevance and external validity of the whole body of evidence. The aim is to produce a recommendation that is evidence-based, but which is relevant to the way in which health care is delivered in Scotland and is therefore implementable.

It is important to emphasise that the grading does not relate to the importance of the recommendation, but to the strength of the supporting evidence and, in particular, to the predictive power of the study designs from which that data was obtained. Thus, the grading assigned to a recommendation indicates to users the

likelihood that, if that recommendation is implemented, the predicted outcome will be achieved.

Considered Judgment

It is rare for the evidence to show clearly and unambiguously what course of action should be recommended for any given question. Consequently, it is not always clear to those who were not involved in the decision making process how guideline developers were able to arrive at their recommendations, given the evidence they had to base them on. In order to address this problem, SIGN has introduced the concept of considered judgment.

Under the heading of considered judgment, guideline development groups summarise their view of the total body of evidence covered by each evidence table. This summary view is expected to cover the following aspects:

- Quantity, quality, and consistency of evidence
- Generalisability of study findings
- Directness of application to the target population for the guideline.
- Clinical impact (i.e., the extent of the impact on the target patient population, and the resources needed to treat them.)
- Implementability (i.e., how practical it would be for the NHS in Scotland to implement the recommendation.)

Guideline development groups are provided with a pro forma in which to record the main points from their considered judgment. Once they have considered these issues, the group is asked to summarise their view of the evidence and assign a level of evidence to it, before going on to derive a graded recommendation.

Additional detail about SIGN's process for formulating guideline recommendations is provided in Section 6 of the companion document titled "SIGN 50: A Guideline Developers' Handbook." (Edinburgh [UK]: Scottish Intercollegiate Guidelines Network. [SIGN publication; no. 50], available from the SIGN Web site.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Grades of Recommendation

Note: The grade of recommendation relates to the strength of the evidence on which the recommendation is based. It does not reflect the clinical importance of the recommendation.

A: At least one meta-analysis, systematic review of randomized controlled trials (RCTs), or RCT rated as 1++ and directly applicable to the target population; or

A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results

B: A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or

Extrapolated evidence from studies rated as 1++ or 1+

C: A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or

Extrapolated evidence from studies rate as 2++

D: Evidence level 3 or 4; or

Extrapolated evidence from studies rated as 2+

Good Practice Points: Recommended best practice based on the clinical experience of the guideline development group.

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The national open meeting is the main consultative phase of Scottish Intercollegiate Guidelines Network (SIGN) guideline development.

Peer Review

All SIGN guidelines are reviewed in draft form by independent expert referees, who are asked to comment primarily on the comprehensiveness and accuracy of interpretation of the evidence base supporting the recommendations in the guideline. A number of general practitioners (GPs) and other primary care practitioners also provide comments on the guideline from the primary care perspective, concentrating particularly on the clarity of the recommendations and their assessment of the usefulness of the guideline as a working tool for the primary care team. The draft is also sent to a lay reviewer in order to obtain comments from the patient's perspective. The comments received from peer reviewers and others are carefully tabulated and discussed with the chairman and with the guideline development group. Each point must be addressed and any changes to the guideline as a result noted or, if no change is made, the reasons for this recorded.

As a final quality control check prior to publication, the guideline and the summary of peer reviewers' comments are reviewed by the SIGN Editorial Group for that guideline to ensure that each point has been addressed adequately and that any risk of bias in the guideline development process as a whole has been minimised. Each member of the guideline development group is then asked formally to approve the final guideline for publication.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary. The recommendations that follow are based on the previous version of the guideline.

Note from the National Guideline Clearinghouse (NGC): *In July 2007, the Scottish Intercollegiate Guidelines Network (SIGN) released an update of their 2005 asthma guideline. The changes made in the 2007 update have been incorporated into the summary below. In addition, a document identifying changes made in the July 2007 update of this guideline is available on the* SIGN Web site.

Note from SIGN and NGC: *In addition to these evidence-based recommendations, the guideline development group also identifies points of best clinical practice in the full-text guideline document.*

The grades of recommendations (A-D) and levels of evidence (1++, 1+, 1-, 2++, 2+, 2-, 3, 4) are defined at the end of the "Major Recommendations" field.

Diagnosis and Natural History

Diagnosis of Asthma in Adults

GPP - Record the presence of wheeze in the patient's notes.

GPP - Objective tests should be used to try to confirm a diagnosis of asthma before long-term therapy is started.

GPP - Failure to respond to asthma treatment should prompt a search for an alternative, or additional, diagnosis.

GPP - Perform chest x-rays in all patients with atypical symptoms.

Diagnosis of Asthma in Children

GPP - Asthma should be suspected in any child with wheezing, ideally heard by a health professional on auscultation, and distinguished from upper airway noises

D - Base the diagnosis of asthma in children on:

- The presence of key features and careful consideration of alternative diagnoses (see table 2 in the original guideline document)
- Assessment of the response to trials of treatment, and ongoing assessment
- Repeated reassessment of the child, questioning the diagnosis if management is ineffective

GPP - Record the criteria on which the diagnosis has been made.

Non-pharmacological Management

Primary Prophylaxis

A - Breastfeeding should be encouraged and its benefits include a protective effect in relation to early life wheezing.

B - Parents and parents-to-be who smoke should be advised of the many adverse effects of smoking on their children, including increased wheezing in infancy, and be offered appropriate support to stop smoking.

Secondary Non-Pharmacological Prophylaxis

GPP - In committed families with evidence of house dust mite allergy and who wish to try mite avoidance, the following are recommended (Warner, 2000):

- Complete barrier bed-covering systems
- Removal of carpets
- Removal of soft toys from bed
- High temperature washing of bed linen
- Acaricides to soft furnishings
- Dehumidification

Environmental Factors

B - Parents who smoke should be advised about the dangers for themselves and their children and offered appropriate support to stop smoking.

GPP - Smoking cessation should be encouraged as it is good for general health and may decrease asthma severity.

Complementary and Alternative Medicine

GPP - The use of ionisers cannot be encouraged, as there is no evidence of benefit and a suggestion of adverse effect.

GPP - In difficult childhood asthma, there may be a role for family therapy as an adjunct to pharmacotherapy.

Dietary Manipulation

C - Weight reduction is recommended in obese patients with asthma to improve asthma control.

Gastro-oesophageal Reflux in Asthma

B - Gastro-oesophageal reflux should be treated if present but this will generally have no impact on asthma control.

Pharmacological Management

GPP - Lung function measurements cannot be reliably used to guide asthma management in children under 5 years of age

In this and the following section ("Inhaler Devices"), each recommendation has been graded for adults (> 12 years old), children 5 to 12 years, and children under 5 years. See Figures 4, 5, and 6 in the original guideline document for a summary of stepwise management in each of the age segments.

Step 1: Mild Intermittent Asthma

Adults: **A**; Children aged 5 to 12 years: **B**; Children under 5 years: **D** - Prescribe an inhaled short acting $beta_2$ agonist as short term reliever therapy for all patients with symptomatic asthma.

Adults: **B**; Children aged 5 to 12 years: **D**; Children under 5 years: **D** - Patients with high usage of inhaled short acting $beta_2$ agonists should have their asthma management reviewed.

Step 2: Introduction of Regular Preventer Therapy

Adults: **A**; Children aged 5 to 12 years: **A**; Children under 5 years: **A** - Inhaled steroids are the recommended preventer drug for adults and children for achieving overall treatment goals.

Adults: **B**; Children aged 5 to 12 years: **C**; Children under 5 years: **Good Practice Point** - Inhaled steroids should be considered for patients with any of the following: exacerbations of asthma in the last two years; using inhaled $beta_2$ agonists three times a week or more; symptomatic three times a week or more, or waking one night a week.

Adults: **A**; Children aged 5 to 12 years: **D**; Children under 5 years: **D** - Give inhaled steroids initially twice daily, except ciclesonide which is given once daily.

Adults: **A**; Children aged 5 to 12 years: **D**; Children under 5 years: **D** - Once a day inhaled steroids at the same total daily dose can be considered if good control is established.

GPP - Titrate the dose of inhaled steroid to the lowest dose at which effective control of asthma is maintained.

GPP - Monitor children's height on a regular basis.

GPP - Specific written advice about steroid replacement in the event of a severe intercurrent illness should be part of the management plan for children treated with ≥800 micrograms per day of beclomethasone (BDP) or equivalent.

GPP - Any child on this dose should be under the care of a specialist paediatrician for duration of the treatment.

GPP - Consider the use of a steroid warning card.

GPP - Consider the possibility of adrenal insufficiency in any child maintained on inhaled steroids presenting with shock or a decreased level of consciousness; serum biochemistry and blood glucose levels should be checked urgently.

GPP - Consider whether intramuscular (IM) hydrocortisone is required.

GPP - Titrate the dose of inhaled steroid to the lowest dose at which effective control of asthma is maintained.

B - Clinicians should be aware that higher doses of inhaled steroids may be needed in patients who are smokers/ex-smokers.

GPP - Patients should be advised that smoking reduces the effectiveness of therapy

GPP - Long-acting inhaled beta-2 agonists should only be started in patients who are already on inhaled corticosteroids.

Step 3: Add-on Therapy

Adults: **A**; Children aged 5 to 12 years: **B**; Children under 5 years: **Good Practice Point** - Carry out a trial of other treatments before increasing the inhaled steroid dose above 800 micrograms/day in adults and 400 micrograms/day in children.

Adults: **A**; Children aged 5 to 12 years: **B**; Children under 5 years: **Recommendation does not apply to this age group.** - The first choice as add-on therapy to inhaled steroids in adults and children (5 to 12 years) is an inhaled long acting $beta_2$ agonist.

Adults: **D**; Children aged 5 to 12 years: **D**; Children under 5 years: **Recommendation does not apply to this age group.** - If asthma control remains sub-optimal after the addition of an inhaled long acting $beta_2$ agonist, then the dose of inhaled steroids should be increased to 800 micrograms/day in adults or 400 micrograms/day in children (5 to 12 years).

Step 4: Poor Control on Moderate Dose of Inhaled Steroid + Add-on Therapy: Addition of Fourth Drug

Adults: **D**; Children aged 5 to 12 years: **D**; Children under 5 years: **Recommendation does not apply to this age group.** - If control remains inadequate on 800 micrograms daily (adults) and 400 micrograms daily (children) of an inhaled steroid plus a long acting $beta_2$ agonist, consider the following interventions:

- Increasing inhaled steroids to 2,000 micrograms/day (adults) or 800 micrograms/day (children 5-12 years)
- Leukotriene receptor antagonists
- Theophyllines
- Slow release $beta_2$ agonist tablets, though caution needs to be used in patients on long acting $beta_2$ agonists.

GPP - If a trial of an add-on treatment is ineffective, stop the drug (or in the case of increased dose of inhaled steroid, reduce to the original dose).

GPP - Before proceeding to step 5, consider referring patients with inadequately controlled asthma, especially children, to specialist care.

Step 5: Continuous or Frequent Use of Oral Steroids

Adults: **A**; Children aged 5 to 12 years: **D**; Children under 5 years: **Recommendation does not apply to this age group.** - In adults the recommended method of eliminating or reducing the dose of steroid tablets is inhaled steroids, at doses of up to 2,000 micrograms/day if required. In children aged 5 to 12, consider very carefully before going above a dose of 1,000 micrograms/day.

Adults: **D**; Children aged 5 to 12 years: **D**; Children under 5 years: **D** - There is a role for a trial of treatment with long acting $beta_2$ agonists, leukotriene receptor antagonists, and theophyllines for about six weeks. They should be stopped if no improvement in steroid dose, symptoms, or lung function is detected.

GPP - Immunosuppressants (methotrexate, ciclosporin and oral gold) may be given as a three month trial, once other drug treatments have proved unsuccessful. Their risks and benefits should be discussed with the patient and their treatment effects carefully monitored. Treatment should be in a centre with experience of using these medicines.

Stepping Down

GPP - Regular review of patients as treatment is stepped down is important. When deciding which drug to step down first and at what rate, the severity of asthma, the side-effects of the treatment, the beneficial effect achieved, and the patient's preference should all be taken into account.

GPP - Patients should be maintained at the lowest possible dose of inhaled steroid. Reduction in inhaled steroid dose should be slow as patients deteriorate at different rates. Reductions should be considered every three months, decreasing the dose by approximately 25 to 50% each time.

Specific Management Problems

GPP - For most patients, exercise-induced asthma is an expression of poorly controlled asthma and regular treatment including inhaled steroids should be reviewed.

If exercise is a specific problem in patients taking inhaled steroids who are otherwise well controlled, consider the following therapies:

Adults: **A**; Children aged 5 to 12 years: **C**; Children under 5 years: **Recommendation does not apply to this age group.** - Leukotriene receptor antagonists

Adults: **A**; Children aged 5 to 12 years: **A**; Children under 5 years: **Recommendation does not apply to this age group.** - Long acting $beta_2$ agonists

Adults: **C**; Children aged 5 to 12 years: **C**; Children under 5 years: **Recommendation does not apply to this age group.** - Chromones

Adults: **A**; Children aged 5 to 12 years: **A**; Children under 5 years: **Recommendation does not apply to this age group.** - Oral $beta_2$ agonists

Adults: **C**; Children aged 5 to 12 years: **C**; Children under 5 years: **Recommendation does not apply to this age group.** - Theophyllines

Adults: **A**; Children aged 5 to 12 years: **A**; Children under 5 years: **Good practice point** - Immediately prior to exercise, inhaled short acting $beta_2$ agonists are the drug of choice

Adults: **C**; Children aged 5 to 12 years: **Recommendation does not apply to this age group**; Children under 5 years: **Recommendation does not apply to this age group.** - In adult patients with allergic bronchopulmonary aspergillosis (ABPA), a four month trial of itraconazole should be considered.

GPP - Careful monitoring for side-effects, particularly hepatic is recommended.

Inhaler Devices

Technique and Training

Adults: **B**; Children aged 5 to 12 years: **Good practice point**; Children under 5 years: **Good practice point.** - Prescribe inhalers only after patients have received training in the use of the device and have demonstrated satisfactory technique.

$Beta_2$ Agonist Delivery

Adults: **A**; Children aged 5 to 12 years: **A**; Children under 5 years: **B**. - Children and adults with mild and moderate exacerbations of asthma should be treated by pressurized metered dose inhaler (pMDI) + spacer with doses titrated according to clinical response.

Adults: **Recommendation does not apply to this age group**; Children aged 5 to 12 years: **A**; Children under 5 years: **Recommendation does not apply to this age group.** - In children aged 5 to 12, pMDI + spacer is as effective as any other hand held inhaler.

Adults: **A**; Children aged 5 to 12 years: **Recommendation does not apply to this age group**; Children under 5 years: **Recommendation does not apply to this age group**. - In adults, pMDI $\pm$ spacer is as effective as any other hand held inhaler, but patients may prefer some types of dry powder inhaler (DPI).

GPP - Choice of reliever inhaler for stable asthma should be based on patient preference and assessment of correct use. Many patients will not be prepared to carry a spacer.

Inhaled Steroids for Stable Asthma

Adults: **Recommendation does not apply to this age group**; Children aged 5 to 12 years: **A**; Children under 5 years: **Recommendation does not apply to this age group**. - In children aged 5 to 12 years, pMDI + spacer is as effective as any DPI.

Adults: **A**; Children aged 5 to 12 years: **Recommendation does not apply to this age group**; Children under 5 years: **Recommendation does not apply to this age group.** - In adults, a pMDI $\pm$ spacer is as effective as any DPI.

Chlorofluorocarbon (CFC) Propellant pMDI versus Hydrofluoroalkane (HFA) Propellant pMDI

Adults: **A**; Children aged 5 to 12 years: **Recommendation does not apply to this age group**; Children under 5 years: **Recommendation does not apply to this age group**. - Salbutamol HFA can be substituted for salbutamol CFC at 1:1 dosing.

Adults: **A**; Children aged 5 to 12 years: **Recommendation does not apply to this age group**; Children under 5 years: **Recommendation does not apply to this age group**. - HFA beclomethasone (BDP) pMDI (Qvar) may be substituted for CFC BDP pMDI at 1:2 dosing. This ratio does not apply to reformulated HFA BDP pMDIs.

Adults: **A**; Children aged 5 to 12 years: **Recommendation does not apply to this age group**; Children under 5 years: **Recommendation does not apply to this age group**. - Fluticasone HFA can be substituted for fluticasone CFC at 1:1 dosing.

Prescribing Devices

GPP - The choice of device may be determined by the choice of drug.

GPP - If the patient is unable to use a device satisfactorily an alternative should be found.

GPP - The patient should have their ability to use an inhaler device assessed by a competent health care professional.

GPP - The medication needs to be titrated against clinical response to ensure optimum efficacy.

GPP - Reassess inhaler technique as part of structured clinical review

GPP - In children aged 0 to 5 years, pMDI and spacer are the preferred method of delivery of beta-2 agonists or inhaled steroids. A face mask is required until the

child can breathe reproducibly using the spacer mouthpiece. Where this is ineffective a nebuliser may be required.

Use and Care of Spacers

GPP - The spacer should be compatible with the pMDI being used.

GPP - The drug should be administered by repeated single actuations of the metered dose inhaler into the spacer, each followed by inhalation.

GPP - There should be minimal delay between pMDI actuation and inhalation.

GPP - Tidal breathing is as effective as single breaths.

GPP - Spacers should be cleaned monthly rather than weekly as per manufacturer's recommendations or performance is adversely affected. They should be washed in detergent and allowed to dry in air. The mouthpiece should be wiped clean of detergent before use.

GPP - Drug delivery may vary significantly due to static charge. Metal and other antistatic spacers are not affected in this way

GPP - Plastic spacers should be replaced at least every 12 months but some may need changing at six months

Management of Acute Asthma

Lessons from Studies of Asthma Deaths and Near Fatal Asthma

B - Health care professionals must be aware that patients with severe asthma and one or more adverse psychosocial factors are at risk of death.

GPP - Keep patients who have had near fatal asthma or brittle asthma under specialist supervision indefinitely.

Acute Asthma in Adults

D - Refer to hospital any patients with features of acute severe or life threatening asthma.

B - Admit patients with any feature of a life threatening or near fatal attack. (Wareham et al., 1993; Mohan et al., 1996; Bucknall et al., 1999; Burr et al., 1999; "Accuracy of death certificates," 1984; Campbell et al., 1997; Innes et al., 1998)

B - Admit patients with any feature of a severe attack persisting after initial treatment. (Wareham et al., 1993; Mohan et al., 1996; Bucknall et al., 1999; Burr et al., 1999; "Accuracy of death certificates," 1984; Campbell et al., 1997; Innes et al., 1998)

C - Patients whose peak flow is greater than 75% best or predicted one hour after initial treatment may be discharged from accident and emergency (A&E), unless they meet any of the following criteria, when admission may be appropriate:

- Still have significant symptoms
- Concerns about compliance
- Living alone/socially isolated
- Psychological problems
- Physical disability or learning difficulties
- Previous near fatal or brittle asthma
- Exacerbation despite adequate dose steroid tablets pre-presentation
- Presentation at night
- Pregnancy

Treatment of Acute Asthma in Adults

C - Give high flow oxygen to all patients with acute severe asthma.

A -

- In hospital, ambulance and primary care, nebulised $beta_2$ agonist bronchodilators should be driven by oxygen.
- Outside hospital, high dose $beta_2$ agonist bronchodilators may be delivered via large volume spacers or nebulisers.

C - Whilst supplemental oxygen is recommended, its absence should not prevent nebulised therapy being given if indicated.

A - Use high dose inhaled $beta_2$ agonists as first line agents in acute asthma and administer as early as possible. Intravenous $beta_2$ agonists should be reserved for those patients in whom inhaled therapy cannot be used reliably.

GPP - In acute asthma with life threatening features the nebulised route (oxygen-driven) is recommended

A - In severe asthma (peak expiratory flow [PEF] or forced expiratory volume in one second [FEV_1] <50% best or predicted) and asthma that is poorly responsive to an initial bolus dose of $beta_2$ agonist, consider continuous nebulisation, using an appropriate nebuliser system.

A - Give steroid tablets in adequate doses in all cases of acute asthma.

GPP - Continue prednisolone 40 to 50 mg daily for at least five days or until recovery

A - Nebulised ipratropium bromide (0.5 mg 4–6 hourly) should be added to $beta_2$ agonist treatment for patients with acute severe or life threatening asthma or those with a poor initial response to $beta_2$ agonist therapy.

A - Consider giving a single dose of intravenous (IV) magnesium sulphate for patients with:

- Acute severe asthma who have not had a good initial response to inhaled bronchodilator therapy
- Life threatening or near fatal asthma

GPP - IV magnesium sulphate (1.2 to 2 g IV infusion over 20 minutes) should only be used following consultation with senior medical staff.

GPP - Use IV aminophylline only after consultation with senior medical staff.

B - Routine prescription of antibiotics is not indicated for acute asthma.

C - All patients transferred to intensive care units should be accompanied by a doctor suitably equipped and skilled to intubate if necessary.

Further Investigation and Monitoring

GPP - Measure and record PEF 15 to 30 minutes after starting treatment, and thereafter according to the response. Measure and record PEF before and after nebulised or inhaled beta-2 agonist bronchodilator (at least four times daily) throughout the hospital stay and until controlled after discharge.

GPP - Record oxygen saturation by oximetry and maintain arterial SaO_2 >92%

GPP - Repeat measurements of blood gas tensions within two hours of starting treatment if:

- The initial PaO_2 is <8 kPa unless SaO_2 is >92%; or
- The initial $PaCO_2$ is normal or raised; or
- The patient's condition deteriorates

GPP - Measure them again if the patient's condition has not improved by 4 to 6 hours.

GPP - Measure and record the heart rate.

GPP - Measure serum potassium and blood glucose concentrations.

GPP - Measure the serum theophylline concentration if aminophylline is continued for more than 24 hours (aim at a concentration of 55 to 110 micromol/l)

GPP - It is essential that the patient's primary care practice is informed within 24 hours of discharge from Accident & Emergency (A&E) or hospital following an asthma exacerbation treated in hospital. Ideally this communication should be directly with a named individual responsible for asthma care within the practice, by means of fax or e-mail.

Acute Asthma in Children Aged Over 2 Years

B - Consider intensive inpatient treatment for children with SpO_2 <92% on air after initial bronchodilator treatment.

GPP - Decisions about admission should be made by trained physicians after repeated assessment of the response to further bronchodilator treatment.

GPP - Attempt to measure PEF or FEV_1 in all children aged >5 years, taking the best of three measurements, ideally expressed as percentage of personal best for PEF (as detailed in a written action plan) or alternatively as percentage of predicted for PEF or FEV_1.

D - The use of structured care protocols detailing bronchodilator usage, clinical assessment, and specific criteria for safe discharge is recommended.

GPP - Children with life threatening asthma or SpO_2 <92% should receive high flow oxygen via a tight fitting face mask or nasal cannula at sufficient flow rates to achieve normal saturations.

A - Inhaled $beta_2$ agonists are the first line treatment for acute asthma. (Schuh et al., 1989; Schuh et al., 1990; Robertson et al., 1985; Schuh et al., 1999)

A - pMDI + spacer are the preferred option in mild to moderate asthma.

B - Individualise drug dosing according to severity and adjust according to the patient's response.

GPP - Children with acute asthma in primary care who have not improved after receiving up to 10 puffs of beta-2 agonist should be referred to hospital. Further doses of bronchodilator should be given as necessary whilst awaiting transfer.

GPP - Treat children transported to hospital by ambulance with oxygen and nebulised beta-2 agonists during the journey.

GPP - Transfer children with severe or life threatening asthma urgently to hospital to receive frequent doses of nebulised beta-2 agonists (2.5 to 5 mg salbutamol or 5 to 10 mg terbutaline).

B - The early addition of a bolus dose of intravenous salbutamol (15 micrograms/kg) can be an effective adjunct to treatment in severe cases.

A - Give prednisolone early in the treatment of acute asthma attacks.

GPP - Use a dose of 20 mg prednisolone for children aged 2 to 5 years and a dose of 30 to 40 mg for children >5 years. Those already receiving maintenance steroid tablets should receive 2 mg/kg prednisolone up to a maximum dose of 60 mg.

GPP - Repeat the dose of prednisolone in children who vomit and consider intravenous steroids in those who are unable to retain orally ingested medication.

GPP - Treatment for up to three days is usually sufficient, but the length of course should be tailored to the number of days necessary to bring about recovery.

GPP - Do not initiate inhaled steroids in preference to steroid tablets to treat acute childhood asthma.

A - If symptoms are refractory to initial beta-2 agonist treatment, add ipratropium bromide (250 micrograms/dose mixed with the nebulised beta-2 agonist solution).

GPP - Repeated doses of ipratropium bromide should be given early to treat children poorly responsive to beta-2 agonists.

A - Aminophylline is not recommended in children with mild to moderate acute asthma.

C - Consider aminophylline in a High Dependency Unit or pediatric intensive care unit (PICU) setting for children with severe or life threatening bronchospasm unresponsive to maximal doses of bronchodilators and steroid tablets.

GPP - Do not give antibiotics routinely in the management of acute childhood asthma

GPP - Electrocardiograph (ECG) monitoring is mandatory for all intravenous treatments.

Treatment of Acute Asthma in Children Aged Less Than 2 Years

B - Oral beta-2 agonists are not recommended for acute asthma in infants.

A - For mild to moderate acute asthma, a pMDI + spacer is the optimal drug delivery device.

B - Consider steroid tablets in infants early in the management of moderate to severe episodes of acute asthma in the hospital setting.

GPP - Steroid tablet therapy (10 mg of soluble prednisolone for up to three days) is the preferred steroid preparation for use in this age group

B - Consider inhaled ipratropium bromide in combination with an inhaled beta-2 agonist for more severe symptoms.

Asthma in Pregnancy

Natural History

D - Offer prepregnancy counselling to women with asthma regarding the importance and safety of continuing their asthma medications during pregnancy to ensure good asthma control.

C - Monitor pregnant women with asthma closely so that any change in course can be matched with an appropriate change in treatment.

GPP - Advise women who smoke about the dangers for themselves and their babies and give appropriate support to stop smoking

Management of Acute Asthma in Pregnancy

C - Give drug therapy for acute asthma as for the non-pregnant patient.

D - Deliver oxygen immediately to maintain saturation above 95%.

D - Acute severe asthma in pregnancy is an emergency and should be treated vigorously in hospital.

GPP - Continuous fetal monitoring is recommended for severe acute asthma.

GPP - For women with poorly controlled asthma during pregnancy there should be close liaison between the respiratory physician and obstetrician.

Drug Therapy in Pregnancy

C - Use beta-2 agonists as normal during pregnancy.

C - Use inhaled steroids as normal during pregnancy.

C - Use oral and intravenous theophyllines as normal during pregnancy.

D - Check blood levels of theophylline in acute severe asthma and in those critically dependent on therapeutic theophylline levels.

C - Use steroid tablets as normal when indicated during pregnancy for severe asthma. Steroid tablets should never be withheld because of pregnancy.

D - Do not commence leukotriene antagonists during pregnancy. They may be continued in women who have demonstrated significant improvement in asthma control with these agents prior to pregnancy not achievable with other medications.

C - Use chromones as normal during pregnancy.

Management During Labour

GPP - Advise women that acute asthma is rare in labour.

GPP - Advise women to continue their usual asthma medications in labour.

GPP - In the absence of acute severe asthma, reserve caesarean section for the usual obstetric indications.

C - If anaesthesia is required, regional blockade is preferable to general anaesthesia in women with asthma.

GPP - Women receiving steroid tablets at a dose exceeding prednisolone 7.5 mg per day for more than two weeks prior to delivery should receive parenteral hydrocortisone 100 mg 6–8 hourly during labour.

D - Use prostaglandin F2-alpha with extreme caution in women with asthma because of the risk of inducing bronchoconstriction.

Drug Therapy in Breastfeeding Mothers

C - Encourage women with asthma to breastfeed.

C - Use asthma medications as normal during lactation, in line with manufacturer's recommendations.

Occupational Asthma

Incidence

B - In patients with adult onset asthma, or reappearance of childhood asthma, clinicians should be suspicious that there may be an occupational cause.

Diagnosis

GPP - Adults with airflow obstruction should be asked:

- *Are you better on days away from work?*
- *Are you better on holiday?*

Those with positive answers should be investigated for occupational asthma.

D - In suspected work-related asthma, the diagnosis of asthma should be confirmed using standard objective criteria.

D - Objective diagnosis of occupational asthma should be made using serial peak flow measurements, with at least four readings per day.

D - A negative specific bronchial challenge in a worker with otherwise good evidence of occupational asthma is not sufficient to exclude the diagnosis.

Management of Occupational Asthma

D - Relocation away from exposure should occur as soon as diagnosis is confirmed, and ideally within 12 months of the first work-related symptoms of asthma.

Organisation and Delivery of Care

Routine Primary Care

B - All people with asthma should have access to primary care delivered by clinicians with appropriate training in asthma management.

B - In primary care, people with asthma should be reviewed regularly by a nurse or doctor with appropriate training in asthma management.

C - General practices should maintain a list of people with asthma.

C - Clinical review should be structured and utilise a standard recording system.

B - Feedback of information to clinicians should link individual patients with recommendations from guidelines.

D - Health professionals who provide asthma care should have heightened awareness of the complex needs of ethnic minorities, socially disadvantaged groups, and those with communication difficulties.

Acute Exacerbations

C - Manage hospital inpatients in specialist rather than general units, where available.

GPP - All services involved in the care of acute asthma should be staffed by appropriately trained personnel and have access to all the equipment needed to manage acute asthma.

B - Clinicians in primary and secondary care should treat asthma according to recommended guidelines.

B - Discharge from hospital or the emergency department should be a planned, supervised event.

B - All people attending hospital with acute exacerbations of asthma should be reviewed by a clinician with expertise in asthma management, preferably within 30 days.

Patient Education and Self-management

Personalised Asthma Action Plans

A - Patients with asthma should be offered self-management education that should focus on individual needs, and be reinforced by a written action plan.

A - Prior to discharge, in-patients should receive individualised asthma action plans, given by clinicians with appropriate training in asthma management.

B - Introduce asthma action plans as part of a structured educational discussion.

Patient Education and Self-Management in Practice

GPP - A hospital admission represents a window of opportunity to review self-management skills. No patient should leave hospital without a written asthma action plan.

GPP - An acute consultation offers the opportunity to determine what action the patient has already taken to deal with the exacerbation. Their self-management strategy may be reinforced or refined and the need for consolidation at a routine follow up considered.

GPP - A consultation for an upper respiratory tract infection or other known trigger is an opportunity to rehearse with the patient their self-management in the event of their asthma deteriorating.

GPP - Brief simple education linked to patient goals is most likely to be acceptable to patients.

Concordance and Compliance

GPP - Prescription counting is a useful index of compliance

GPP - Provide simple, verbal and written instructions and information on drug treatment for patients and carers.

Definitions:

Grades of Recommendation

The grade of recommendation relates to the strength of the evidence on which the recommendation is based. It does not reflect the clinical importance of the recommendation.

Grade A: At least one meta-analysis, systematic review of randomised controlled trials (RCTs), or randomised controlled trial rated as 1++ and directly applicable to the target population; or

A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results

Grade B: A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or

Extrapolated evidence from studies rated as 1++ or 1+

Grade C: A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or

Extrapolated evidence from studies rated as 2++

Grade D: Evidence level 3 or 4; or

Extrapolated evidence from studies rated as 2+

Good Practice Points: Recommended best practice based on the clinical experience of the guideline development group.

Levels of Evidence

1++ - High quality meta-analyses, systematic reviews of randomised controlled trials (RCTs), or RCTs with a very low risk of bias

1+ - Well-conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias

1- - Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias

2++ - High quality systematic reviews of case control or cohort studies. High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal

2+ - Well-conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal

2- - Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal

3 - Non-analytic studies (e.g. case reports, case series)

4 - Expert opinion

CLINICAL ALGORITHM(S)

Algorithms are provided in the original guideline document for:

- Management of acute severe asthma in adults in general practice (Annex 1)
- Management of acute severe asthma in adults in Accident and Emergency (A&E) (Annex 2)
- Management of acute severe asthma in adults in hospital (Annex 3)
- Management of acute asthma in children in general practice (age 2 to 5 years)(Annex 4)
- Management of acute asthma in children in general practice (age > 5 years)(Annex 4)
- Management of acute asthma in children in A&E (age 2 to 5 years)(Annex 5)
- Management of acute asthma in children in A&E (age > 5 years)(Annex 5)
- Management of acute asthma in children in hospital (age 2 to 5 years)(Annex 6)
- Management of acute asthma in children in hospital (age > 5 years)(Annex 6)
- Management of acute asthma in infants aged <2 in hospital (Annex 7)
- Work-related asthma and rhinitis: case finding and management in primary care (Annex 10)
- Diagnosis of asthma in children (Figure 2)
- Pharmacological management of asthma: add-on therapy (Figure 3)

- Summary of stepwise management in adults (Figure 4)
- Summary of stepwise management in children aged 5 to 12 years (Figure 5)
- Summary of stepwise management in children less than 5 years (Figure 6)

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Control of symptoms, including nocturnal symptoms and exercise-induced asthma
- Prevention of exacerbations
- Achievement of best possible pulmonary function with minimal side effects

POTENTIAL HARMS

There may be side effects associated with the use of certain asthma medications. Refer to the original guideline document for details.

CONTRAINDICATIONS

CONTRAINDICATIONS

- Beta-blockers, including eye drops, are contraindicated in patients with asthma.
- During labour, use prostaglandin F2-alpha with extreme caution in women with asthma because of the risk of inducing bronchoconstriction.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

This guideline is not intended to be construed or to serve as a standard of medical care. Standards of care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge and technology advance and patterns of care evolve. These parameters of practice should be considered guidelines only. Adherence to them will not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at

the same results. The ultimate judgement regarding a particular clinical procedure or treatment plan must be made by the doctor, following discussion of the options with the patient, in light of the diagnostic and treatment choices available. However, it is advised that significant departures from the national guideline or any local guidelines derived from it should be fully documented in the patient's case notes at the time the relevant decision is taken.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

Dissemination and Implementation

A number of initiatives are underway to support the implementation of the guideline. These include:

- Dissemination activities including mailings and the use of lay and medical media
- Distribution of profession- and locality-specific summaries
- Distribution of educational materials including "off-the-shelf" presentation packages, case histories suitable for discussion, and scenarios for problem-based learning (available on CD-ROM and the Scottish Intercollegiate Guidelines Network [SIGN] and British Thoracic Society [BTS] Web sites; see the related "Companion Documents" field for further information)
- Distribution of summary wall charts for different health care settings
- Electronic links between the guideline and electronic support systems, e.g., GPASS and VAMP in primary care to enhance intraconsultation prompting
- Development and distribution of patient information materials (see the related "Patient Resources" field for further information).

Further details of these initiatives are available on the SIGN Web site and BTS Web site.

Outcomes and Audit

Evidence suggests that guidelines alone do not affect clinical practice. Feedback based on audit is useful, both as part of an implementation strategy and for longer term positive influence on practice. The recommendations listed below are intended to assist in auditing the recommendations contained in the guideline. The gradings relate to the benefit demonstrated for the intervention being audited. Audit datasets (including definitions) are listed in Annex 9 of the original guideline document.

The grades of recommendations (A-D) are defined at the end of the "Description of Implementation Strategy" field.

Primary Care and Hospital Clinics

C - Use a structured record for asthma patients, including a system for recording inhaler technique, morbidity, peak expiratory flow (PEF) levels, current treatment, and asthma action plans.

B - Practices should offer nurse-run structured care for targeted patients with asthma.

C - Health professionals should be involved in clinical audit.

A - Self-regulation based continuing medical education (CME) courses on asthma management are recommended for doctors.

Identify groups of patients at risk:

- **C** - Children with frequent consultations with respiratory infection
- **A** - Children over 5 years with persistent symptoms of asthma
- **C** - Patients with asthma and psychiatric disease or learning disability
- **B** - Patients using large quantities of $beta_2$ agonists

B - Monitor the provision of asthma action plans, particularly to patients:

- With moderate or severe asthma, based on step 3 or above
- With regular symptoms
- Having frequent steroid courses or exacerbations
- Having emergency nebulisation or accident and emergency attendances/hospitalisations
- Seeing different doctors

C - Specialist review in adults with continuing symptoms is recommended to confirm or refute a diagnosis of asthma and to identify and manage the causes of persistent symptoms.

Monitor the proportion of patients with active disease or taking asthma treatment, including those:

- **C** - Having no or few current symptoms
- **A** - Able to use their prescribed inhalers effectively
- **A** - Using inhaled steroids
- **C** - With normal lung function (PEF or forced expiratory volume in one second [FEV_1] >80% predicted)
- **C** - With actual/best PEF or FEV_1 >85%
- **A** - With an asthma action plan (*patients who should have an action plan include those on step 3 or above, plus any not on this level of treatment who have had an emergency nebulisation, a course of oral steroids, or accident and emergency [A&E] attendance or hospital admission with asthma within the past 12 months*).

B - Recommended tools for monitoring morbidity: Royal College of Physicians (RCP) three questions (see section 12 in the original guideline document) or tools which incorporate these (such as the Tayside stamp, Jones index, and Q score).

Outcomes for Management of Acute Asthma in Primary Care

Monitor the proportion of patients attending for an unscheduled appointment or seen urgently, including those receiving emergency nebulisation who:

- **C** - Who have PEF measured
- **A** - Are given steroid tablets
- **C** - Are seen for review after an unscheduled visit, in order to confirm improvement (objectively, with PEF) and target them for teaching of self-management skills

Accident and Emergency Care for Patients with Asthma

C - Structure asthma care to prompt the recording of key aspects of assessment and treatment (include historical data on previous attendances, corticosteroid, home nebuliser use, administration of steroid tablets, pulse, PEF, oxygen saturations, arterial blood gases).

A - Monitor access to an asthma specialist nurse for teaching of self-management skills (adults).

B - Monitor the rate of referral for specialist medical review.

A - Monitor the proportion of patients with acute asthma who are treated with steroid tablets within one hour of attendance, and the overall percentage.

Hospital Inpatients with Acute Asthma

C - Monitor the proportion of patients seen by a respiratory specialist.

A - Monitor the proportion of patients seen by an asthma specialist nurse.

B - Monitor the availability of outpatient programmes teaching self-management skills for those who have had a recent hospital admission.

C - Monitor the use of prompts (e.g., stamps, proformas, clinical pathways) to promote good quality of care and improve the collection of relevant process of care data.

C - Measure adherence to guideline recommendations using the BTS (adults) or British Paediatric Respiratory Society (BPRS) (children) audit tools (available at www.brit-thoracic.org.uk).

Outcomes of Care for Hospital Management of Acute Asthma

B - Monitor readmission rates (within two months), where readmissions can be linked between different institutions or are only likely to occur to the same institution.

Grades of Recommendation

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Grade A: At least one meta-analysis, systematic review of randomised controlled trials (RCTs), or randomised controlled trial rated as 1++ and directly applicable to the target population; or

A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results

Grade B: A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or

Extrapolated evidence from studies rated as 1++ or 1+

Grade C: A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or

Extrapolated evidence from studies rated as 2++

Grade D: Evidence level 3 or 4; or

Extrapolated evidence from studies rated as 2+

IMPLEMENTATION TOOLS

Audit Criteria/Indicators
Chart Documentation/Checklists/Forms
Clinical Algorithm
Quick Reference Guides/Physician Guides

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness
Staying Healthy

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Scottish Intercollegiate Guidelines Network (SIGN), British Thoracic Society. British guideline on the management of asthma. A national clinical guideline. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network (SIGN); 2007 Jul. 94 p. [680 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2003 Jan (revised 2007 Jul)

GUIDELINE DEVELOPER(S)

British Thoracic Society - Medical Specialty Society
Scottish Intercollegiate Guidelines Network - National Government Agency [Non-U.S.]

SOURCE(S) OF FUNDING

Scottish Executive Health Department

GUIDELINE COMMITTEE

Not stated

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Declarations of interests were made by all members of the guideline development group. Further details are available from the Scottish Intercollegiate Guidelines Network (SIGN) Executive.

GUIDELINE STATUS

Note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary.

GUIDELINE AVAILABILITY

Electronic copies of the updated guideline: Available from the Scottish Intercollegiate Guidelines Network (SIGN) Web site.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Quick reference guide: British guideline on the management of asthma. Edinburgh (UK): Scottish Intercollegiate Guidelines Network, 2004 May. 20 p. Available in Portable Document Format (PDF) from the Scottish Intercollegiate Guidelines Network (SIGN) Web site. Addendum to the April 2004 Guideline available from the SIGN Web site.
- SIGN 50: a guideline developers' handbook. Edinburgh (UK): Scottish Intercollegiate Guidelines Network. (SIGN publication; no. 50). Available from the SIGN Web site.
- Appraising the quality of clinical guidelines. The SIGN guide to the AGREE (Appraisal of Guidelines Research and Evaluation) guideline appraisal instrument. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network, 2001. Available from the SIGN Web site.

PATIENT RESOURCES

None available

NGC STATUS

This summary was prepared by ECRI on November 20, 2003. An addendum to this summary was prepared on September 8, 2004. The information was verified by the guideline developer on December 2, 2004. This summary was updated by ECRI on December 5, 2005 and September 27, 2007.

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Date Modified: 9/22/2008